Volume 15

Study G-I
Job R-IV-D
Study A-I

STATE OF ALASKA

William A. Egan, Governor

Annual Report of Performance for

INVENTORY AND CATALOGING

DISSEMINATION OF INFORMATION COLLECTED ON DOLLY VARDEN

INVESTIGATIONS OF PUBLIC FISHING ACCESS AND AQUATIC HABITAT REQUIREMENTS

by

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RESEARCH PROJECT SEGMENT

State:	ALASKA	Name:	Sport Fish Investigations of Alaska.
Project No.:	F - 9 - 6		
Study No.:	G - I	Study Title:	INVENTORY AND CATALOGING.
Job No.:	G - I - F	Job Title:	Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River Drainages.

Period Covered: May 1, 1973 to April 30, 1974

ABSTRACT

Thirty-one managed lakes were test netted to determine the survival and condition of experimentally stocked fish and the status of native fish stocks. Seventeen lakes, previously unsurveyed, were sampled with gill nets for population analysis.

The major spawning area for red salmon, Oncorhynchus nerka, in the Robe Lake system, Brownie Creek, was located and 1,300 red salmon counted during 1973.

The sport fish harvest of red salmon at Eshamy Creek increased from 1,353 fish in 1972 to 2,612 in 1973.

The total number of red and king salmon, O. tshawytscha, estimated at the Gulkana River counting tower during 1973 was 1,292 and 318, respectively. During 65% of the days observations were made, water and weather conditions were such that counts could not be made or were severely limited.

RECOMMENDATIONS

1. Continue the cooperative study of grayling in Poplar Grove Creek.

2. Continue the study of anadromous fish stocks in the upper Copper River drainage and Prince William Sound.

3. Conduct a creel census of Gulkana River and Valdez Arm salmon fishermen in 1974.

4. Experimental stocking of salmonids and other hatchery-produced fish be continued where conditions are deemed suitable, and follow-up surveys conducted to determine the success of these experimental introductions.

5. Continue the monitoring of road and bridge construction, pipeline construction, and other land uses to afford maximum protection to the fishery resource and habitat.

6. Cataloging and inventory surveys be continued on a limited basis.

7. Continue rehabilitation of suitable lakes and the establishment of sport fisheries where practical.

OBJECTIVES

1. To determine the environmental characteristics of the existing and potential recreational fishing waters of the job area, and where practical, obtain estimates of the sport fish harvest and angler participation rate.

2. To assist in determining the current status of public access to the recreational fishing waters within the job area, and to make recommendations for selection of recreational fishing access sites.

3. To determine stocking measures and to formulate recommendations for the management of area waters and direct the course of future studies.

4. To determine the magnitude of various fish stocks and develop plans for their enhancement.

TECHNIQUES USED

Standard techniques as described by Williams (1971) were used in lake and stream surveys, water sample analysis, and in collecting fish samples.

Salmon counts at the Gulkana River site were made 15 minutes during each hour, for each side of the river. When fish counts were made from only one side of the river, they were made for 20 minutes of each hour. Counts made each day were expanded for the 24-hour period.

The Gulkana River creel census area was divided into two sections. Each section was censused during two four-hour periods on each Saturday, Sunday, and on two week-days. Car and angler counts were conducted in the middle of each four-hour period to determine the number of anglers fishing.

Lake locations are given by range, township, and section. When lakes were located in unsurveyed areas, latitude and longitude were used.

Otoliths were collected, mounted on black plastic impression plates and read with the aid of a binocular scope. Water or glycerine was placed upon the otolith to aid in reading.

FINDINGS

Population Sampling, Managed Lakes

Fish Populations of Lower Copper River:

Thirteen managed lakes in the lower Copper River-Prince William Sound area were sampled with test nets in 1973, and the results shown in Table 1.

Rainbow trout, Salmo gairdneri, have been stocked periodically since 1960 in Corser, Lower Beaver, Island, Cabin, Middle, and Twenty-two Mile lakes, with the latest plants made in 1971. Test netting of these waters produced only Dolly Varden, Salvelinus malma; cutthroat trout, S. clarki clarki; and grayling, Thymallus arcticus. Stocking of rainbow trout in waters inhabited by viable stocks of cutthroat trout and Dolly Varden appear fruitless and this practice will be discontinued.

During a study of the Robe Lake system, test netting was conducted for an assessment of the fish population present. Silver salmon, Oncorhynchus kisutch, smolt to 130 mm in fork length, and Dolly Varden to 390 mm in fork length were taken.

Canoe Pass Lake #1, located on Hawkins Island, was test netted to determine changes in the fish population since it was last netted in 1965. The net frequency in 1973 was 1.26 cutthroat trout per hour as compared to 0.4 in 1965 (Williams, 1966), and the mean lengths of 202 mm and 211 mm, respectively, were almost identical.

Turner Lake, located in Galena Bay, was test netted in 1973. Eleven Dolly Varden captured averaged 139 mm in fork length. Although this lake is only one-half mile from the beach and a public cabin is available, it is not attractive to anglers because of the small fish present.

TABLE 1. Gill Net Summaries, Managed Lakes, Lower Copper River and Prince William Sound Drainages, 1973.

Name	Location	No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency	Percent Composition
Lower Beaver Pond	Lat. 60° 30' 10"						
	Long. 145' 27"	11	CT	179-315	234	0.49	73%
		4	DV	198-300	247	0.18	27%
Cabin	Lat. 60° 31' 40"	18	SS	88-120	103	0.84	45%
	Long. 145° 27' 20"	20	DV	100-195	120	0.93	50%
		2	CT	125-130	128	0.09	5%
Canoe Pass #2	Lat. 60° 30' 45"						
	Long. 146° 4' 30"						
Corser	Lat. 60° 31' 50"						
	Long. 145° 27'	2	CT	168-235	202	0.08	100%
Slate	Lat. 60° 28'	19	CT	250-365	283	0.27	100%
	Long. 145° 56'						
Island	Lat. 60° 31' 5"	7	CT	203-290	240	0.18	100%
	Long. 145° 30'						
Little Echo	Lat. 60° 29' 15"	1	GR	167	167	0.04	100%
	Long. 145° 19'						
Middle	Lat. 60° 31' 5"	29	CT	139-315	233	1.32	93.5%
	Long. 145° 30'	2	DV	177-224	200	0.09	6.5%
Pipeline	Lat. 60° 28' 20"	1	DV	220	220	0.04	20%
	Long. 145° 13' 55"	4	CT	155-340	278	0.16	80%
Twenty-Two	Lat. 60° 28' 40"	3	DV	175-320	258	0.13	43%
	Long. 145° 13' 45"	4	GR	300-330	316	0.17	57%
Quarry	Lat. 60° 28' 30"	- No Fish	--	---	---	----	--
	Long. 145° 20'						
Robe	Lat. 61' 5"	28	DV	125-390	240	0.46	68%
	Long. 146' 10"	13	SS	110-130	125	0.21	32%
Turner	T11S R8W S15	11	DV	110-175	139	0.27	100%

*CT - Cutthroat Trout DV - Dolly Varden SS - Silver Salmon GR - Grayling
**Frequency is number of fish per net hour.

Upper Copper River:

Eighteen managed lakes in the upper Copper River and upper Susitna River drainages were test netted in 1973. The results are shown in Table 2.

Moose and Ruth lakes on the Chitina-McCarthy road were test netted to determine the survival of experimental grayling plants made in 1972. No fish were taken. A previous plant of grayling, made in 1969, survived the winter of 1969-70, but apparently succumbed to low dissolved oxygen levels the following winter.

Seven Mile Lake on the Denali highway was test netted in 1973 to determine any changes in the composition of the lake trout, Salvelinus namaycush, population. The net frequency of 0.70 was down from the 1.30 of 1965; however, the mean length of 430 mm for 1973 lake trout was larger than the mean length of 381 mm for 1965 fish. A road to this lake was completed in 1972 and fishing pressure will continue to increase.

The grayling population in Moose Lake was eliminated in the winter of 1970-71 as a result of low dissolved oxygen concentrations. Grayling fry were stocked in 1972 and 1973 and the frequency of net-caught grayling increased from 0.0 in 1971 to 2.4 in 1973 (Williams, 1972). This increase appears to be the result of both stocking and natural recruitment from adjoining Tolsona Lake.

Frequency of net-caught grayling in Tolsona Lake continued to increase following a partial winter kill in 1970-71. The net frequency for grayling in 1973 was 2.74, the highest since 1966, when it was 4.27 (Williams, 1967). Thirty percent of the grayling captured were age I, most likely the result of artificial stocking.

Lower Tebay Lake was test netted during investigations of the drainage as a possible rainbow trout egg-taking site. Forty-three rainbow trout taken ranged from 180 to 350 mm in fork length and averaged 267 mm. Upper and Middle Tebay lakes were also sampled at this time (Table 3). Rainbow trout from Upper Tebay averaged 61 mm longer than those from Lower Tebay Lake and the net frequency was slightly higher at 1.4 fish per hour, as compared to 1.1 for the lower lake. There are ample numbers of rainbow trout in this drainage to support an egg-taking program; however, the small size of the fish and inaccessability of the system may make such a project both logistically and biologically unsound. Additional investigations will be conducted in 1974.

Dick Lake was test netted to determine the results of silver salmon plants made in 1970 and 1972. Only one silver salmon, 103 mm in fork length, was taken with 19 grayling that ranged from 220 to 426 mm in fork length. The competition from the resident grayling may have been too great for the hatchery silver salmon.

George Lake, located near Lake Louise, was test netted to determine the result of low dissolved oxygen concentrations during the winter of 1971-72. Four grayling ranging from 132 to 290 mm in fork length were taken. The net frequency for grayling in 1973 was 0.09, as compared to 2.8 in 1965 when the fish ranged from 155 to 427 mm fork length.

TABLE 2. Gill Net Summaries - Managed Lakes, Upper Copper River and Upper Susitna River Drainages, 1973.

Name	Location	No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Junction	T4N R6W S33	71	GR	110-380	211	3.0	100%
Kettle	T9N R11E S18	2	LT	375-388	365	0.05	20%
		1	SK	---	---	----	----
Moose (Glenn)	T4N R5W S13, 14	117	GR	100-390	265	2.4	91%
		11	SK	100-410	140	0.2	9%
Suslota	Lat. 62° 42' 30"						
	Long. 144° 34'	10	GR	172-413	313	0.26	14%
		28	WF	281-487	392	0.71	40%
		25	SK	197-481	386	0.64	36%
		6	BB	334-561	433	0.15	9%
		1	LT	140	140	0.03	1%
Tebay	Lat. 61' 12"	43	RT	180-350	267	1.1	81%
	Long. 144' 15"	10	DV	160-215	187	0.3	19%
Tolsona	T4W R5W S24	107	GR	110-410	263	2.74	78%
		28	SK	240-490	377	0.71	21%
		1	BB	560	560	0.03	1%
Arizona	T8N R7W S11	17	GR	135-170	157	0.47	100%
Buffalo	T3N R7W S2SE 1/4	0	- No Fish Caught -		---	----	---
Crater (Lk. Louise)	T4N R6W S29NW 1/4	6	RT	85-215	122	0.16	100%
Dick	T13N R1W S31	19	GR	220-425	307	0.43	95%
		1	SS	103	103	0.3	5%
George	Lat. 62° 17'						
	Long. 146° 32'	4	GR	132-290	208	0.09	100%
Hallie	Lat. 63° 5'						
	Long. 145° 41'	- No Fish -	--	---	---	----	---
Tex Smith	T4N R6W S27	32	RT	95-495	162	0.76	64%
		18	SS	242-365	310	0.42	36%
Bear Cub	T21N R9E S29	- No Fish -		---	---	----	---
Seven Mile	Lat. 63° 5' 40"	31	LT	400-455	430	0.70	94%
	Long. 145° 37'						
Moose (McCarthy)	T6S R10E S6	- No Fish -		---	---	----	---
Ruth	T6S R11W S9	- No Fish -		---	---	----	---
June	T11N R1W S5WE 1/4	1	WF	240	240	0.05	33%
		2	SK	260-315	288	0.10	67%

*GR - Grayling SK - Suckers BB - Burbot RT - Rainbow Trout
LT - Lake Trout SS - Silver Salmon DV - Dolly Varden WF - Whitefish

**Frequency is the number of fish per net hour.

TABLE 5. Gill Net Summaries, New Lakes, Upper Copper River and Upper Susitna River Drainage, 1973.

Name	Location	No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Dome	Lat. 62° 48' Long. 144° 10'	--No Fish---		----	---	---	---
Raindrop	Lat. 62° 57' Long. 144° 22'	11	LT	345-430	403	.3	100%
Squirrel	T3S R1W S16	22	DV	115-385	239	.05	100%
Upper Tebay	Lat. 61° 11' Long. 142° 22' 30"	35	RT	160-420	328	1.4	92%
		3	DV	180-195	185	.1	8%
Middle Tebay	Lat. 61° 12' Long. 144° 20'	64	RT	160-440	261	1.3	68%
		31	DV	100-270	171	.6	32%
Indian	Lat. 62° 47' Long.144° 25'	--No Fish--		----	---	---	--
Andy	Lat. 62° 57' 30" Long. 144° 21' 30"	45	LT	180-635	338	1.3	100%
Indian Pass	T12N R8E S17	32	LT	170-415	333	.9	46%
		37	WF	290-410	367	1.1	54%

*LT - Lake Trout
DV - Dolly Varden
RT - Rainbow Trout
WF - Whitefish

**Frequency is number of fish per net hour.

Population Sampling - New Lakes

In 1973, 17 previously unsurveyed lakes were test netted to determine fish species present and their relative abundance. This data is presented in Tables 3 and 4.

Nine of the lakes surveyed are located in the Prince William Sound and Lower Copper River drainages, and eight in the upper Copper River and upper Susitna River drainages. Physical and biological data is presented in Tables 5 and 6.

Robe Lake Investigations

In 1972 investigations of the Robe River system for determinations of rehabilitation and/or fishery enhancement potential were initiated. This study was continued in 1973.

The major spawning area for red salmon, O. nerka, in the Robe Lake system was located and identified as Brownie Creek. This small stream (fall stream flow of 7 cfs) is an inlet to upper Robe Lake (Figure 1). Brownie Creek was not observed in the past because of the dense vegetative canopy. During a ground survey made on July 30, a total of 1,300 red salmon were counted in the upper one-quarter of the stream. On the same day, only nine red salmon were enumerated in Corbin Creek, another major tributary to Robe Lake.

Corbin Creek is the primary silver salmon spawning stream in the system. In 1973, 1,400 salmon spawned in this stream, as compared to 2,000 in 1972. The lower numbers of returning silver salmon in 1973 was apparently due to the severe winter of 1970-71, which caused high mortality of fry and fingerlings.

Eighteen female and 17 male silver salmon were randomly collected from Corbin Creek. The fish were measured and then aged by analysis of both scale and otolith. Fork length measurements ranged from 690 to 775 mm for females and 720 to 825 mm for males. Mean fork length was 717 mm for females and 745 mm for males. Correlation between otolith and scale age was 95%. All fish were age 2.1

Figure 2 represents three overnight samplings of stickleback, Gasterosteus aculeatus, from Robe Lake. A standard minnow trap, baited with salmon eggs and set in approximately three feet of water, was used. The minnow trap was not effective in capturing fish less than 40 mm in length. Young-of-the-year (12-15 mm fork length) stickleback were observed around the June 29th set but none were caught. Failure to capture mature fish in late June and September indicates they die shortly after spawning in early May. This is similar to findings by Engel (1971) for Kenai Peninsula lakes, where stickleback have a life span of 2-1/4 years. Robe Lake stickleback apparently grow to a larger size (85 mm) than reported by Engel or Greenbank (1959) for Karluk Lake on Kodiak Island.

By late August, 90% of the surface of Robe Lake is covered with vegetation. The dominant species of submergent vegetation are Potogometon perfoliotus, and Equisetum fluviatile. The primary type of emergent vegetation is Carex sp.

TABLE 4. Gill Net Summaries, New Lakes, Lower Copper River and Prince William Sound Drainages, 1973.

Name	Location	No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Boswell	T17S R6W S11	42	RS	----	---	0.87	34%
		39	CT	114-380	215	0.82	33%
		40	DV	110-415	225	0.83	33%
Columbia	T10S 410W S2	4	DV	120-150	133	0.07	80%
		1	CD	80	80	0.01	20%
Green	T11S R8W S22	2	DV	185-265	225	0.05	100%
Lily Pad	T12S R7W S21	16	CT	170-300	243	0.94	27%
		44	DV	155-350	270	2.58	73%
Peninsula	Lat. 61° 2' 30"	1	RS	410	410	0.41	53%
	Long. 144° 44'	2	RS	210	210	0.41	53%
		7	RS	100-130	110	0.41	53%
		6	WF	105-425	237	0.25	32%
		3	SK	310-375	345	0.12	15%
Pocket	Lat. 61° 04'						
	Long. 144° 50'	- No Fish -		---	---	----	--
Sellen	T15S R1W S29	- No Fish -		---	---	----	--
Steamboat	Lat. 61° 1' 30"						
	Long. 144° 30'	3	WF	220-340	260	0.12	75%
		1	DV	370	370	0.04	25%
Tokum	Lat. 60° 25'	8	RS	495-640	550	0.29	20%
	Long. 145° 42'	2	RS	125	125	0.07	5%
		2	SS	125	125	0.07	5%
		4	LT	450-695	540	0.15	10%
		11	WF	165-470	395	0.39	26%
		14	DV	140-445	325	0.50	34%

*RS - Red Salmon CT - Cutthroat Trout DV - Dolly Varden LT - Lake Trout
WF - Whitefish SK - Suckers SS - Silver Salmon

**Frequency is number of fish per net hour.

TABLE 5. Physical and Biological Data From New Lakes Surveyed in the Lower Copper River and Prince William Sound Drainages, 1973.

Lake	Surface Area Acres	Maximum Depth (ft)	% of Shoal Area	Barriers*	Fish Species Present**	Location by Bay or Drainage
Boswell	75	65	10%	no	RS, CT, DV	Boswell Bay
Columbia	720	67	5%	yes	DV, Sc	Columbia Glacier
Green	15	56	5%	yes	DV	Galina Bay
Peninsula	250	22	45%	no	RS, WF, SK	Bremner River
Pocket	50	50	10%	yes	None	Tasnuna River
Sellen	5	14	100%	yes	None	Cabin Creek
Steamboat	150	22	15%	no	DV, WF	Bremner River
Tokun	555	105	10%	no	RS, SS, LT DV, CT, WF	Martin River
Lily Pad	10	12	95%	no	CT, DV.	Port Fidalgo

*Barriar to In-Migration from the Marine Environment

**DV - Dolly Varden
Sc - Sculpins
RS - Red Salmon
WF - Whitefish
SK - Suckers
SS - Silver Salmon
LT - Lake Trout
CT - Cutthroat Trout

TABLE 6. Physical and Biological Data from New Lakes Surveyed in the Upper Copper River and Upper Susitna River Drainages, 1975.

Lake	Surface Area Acres	Maximum Depth (ft)	% of Shoal Area	Fish Species Present*	Location by Bay or Drainage
Dome	80	54	10%	None	Fish Creek
Raindrop	35		60%	LT	W. Fork Chistochina River
Squirrel	50	47	15%	DV	Squirrel Creek
Upper Tebay	600	95		RT, DV	Tebay River
Middle Tebay	80	85	5%	RT, DV	Tebay River
Indian	40	32	5%	None	Indian River
Andy	70		20%	LT	W. Fork Chistochina River
Indian Pass	80	60	5%	LT, WF	Porcupine Creek

*DV - Dolly Varden
WF - Whitefish
LT - Lake Trout
RT - Rainbow Trout

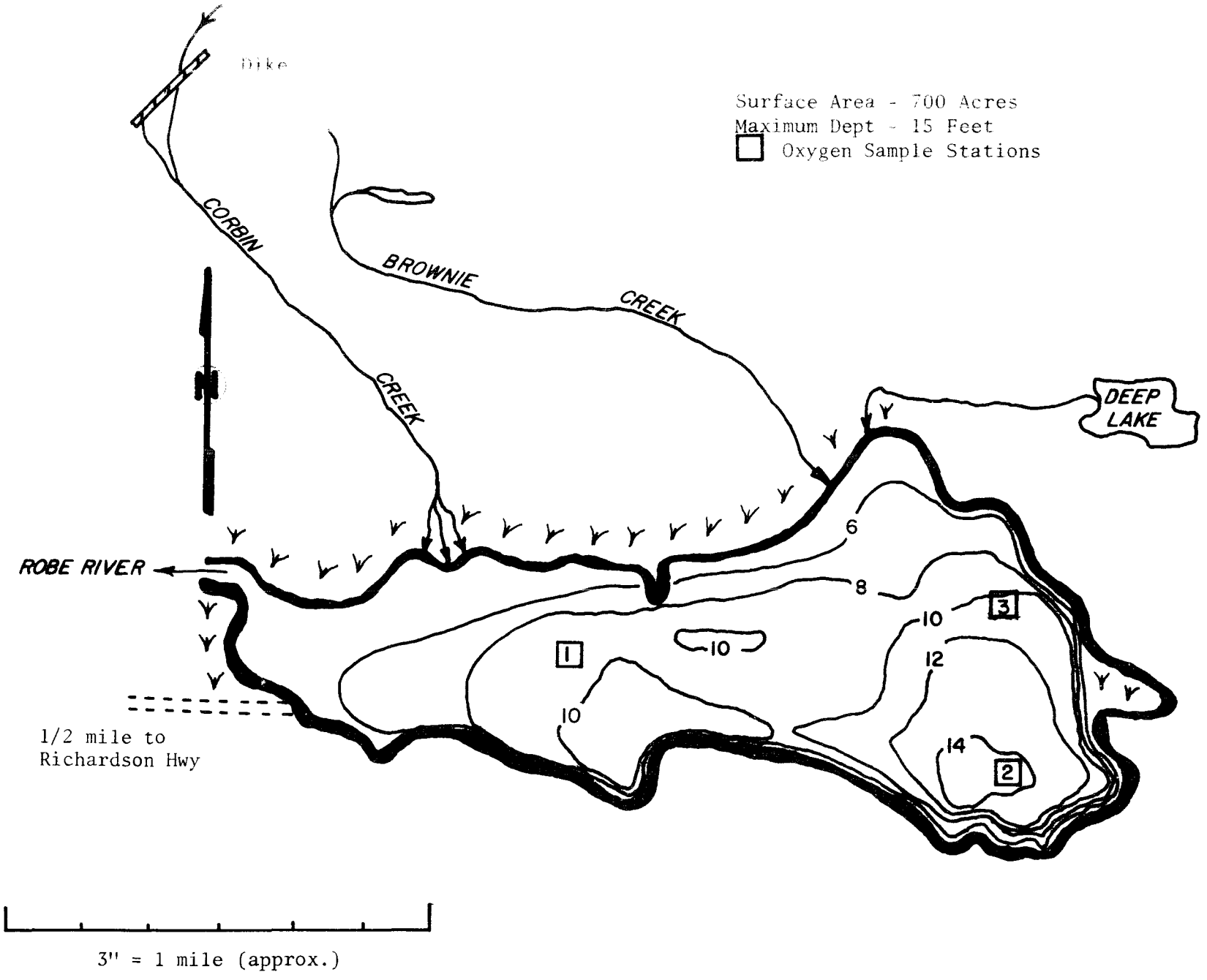
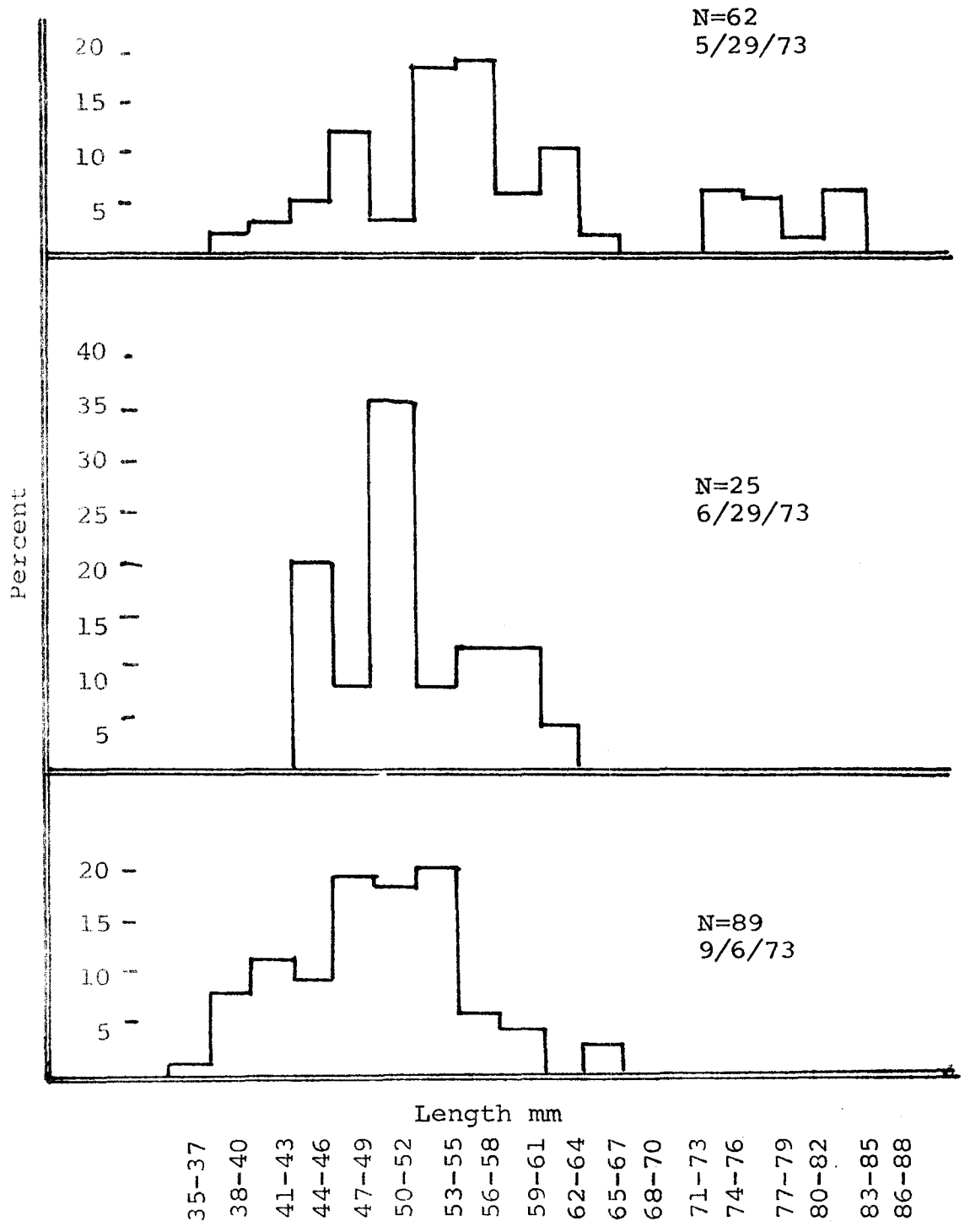


FIGURE 1. Robe Lake System

FIGURE 2. Stickleback Length-Frequency Histograms from Robe Lake, 1973.



Three dissolved oxygen sampling stations were established on Robe Lake in the winter of 1973-74 (Figure 1). Data collected is presented in Table 7.

Dissolved oxygen concentrations at station 1 are fairly stable. Water entering Robe Lake from Brownie and Deep creeks probably flows toward the outlet along the north side of the lake bringing a constant supply of oxygenated water to station 1. Station 3, being south of this flow, receives less of this fresh water, and station 2, farthest distance from the north side, receives little or none of this fresh water.

TABLE 7 Dissolved Oxygen Determinations. Robe Lake, Winter 1973-74*

Date	Station 1 Max. Depth 9 ft.	Station 2 Max. Depth 13 ft.	Station 3 Max. Depth 7 ft.
January 8, 1974	8.5	5.5	1.0
January 24, 1974	7.0	6.0	1.0
February 27, 1974	10.0	5.5	1.0
March 12, 1974	8.0	4.5	1.0

* All samples taken at 6 ft. Ice thickness varied from 27 inches on January 8 to 36 inches on March 12.

Valdez Silver Salmon Derby

In 1973, the Valdez silver salmon derby was conducted from August 11 through September 3. A total of 963 anglers registered for this derby, an increase of 100 over 1972.

A creel census was conducted on August 11, 12, and 13, at the small boat harbor. Ninety-three anglers interviewed fished 316 hours for a catch of 79 silver salmon, 24 chum salmon, O. keta, and 21 pink salmon, O. gorbuscha. Silver salmon were caught at the rate of 0.25 fish per hour, which was higher than the 0.14 fish per hour recorded in 1972. It is believed the recorded catch rate is high and may not accurately reflect actual fishing conditions, as the escapement of silver salmon in 1973 was below that of 1972 (Table 8).

Port Valdez Stream Surveys

Stream surveys in 1973 were made in cooperation with the National Marine Fisheries Service. Table 8 presents a summary of streams surveyed initially in 1972, and a second time during 1973. In comparison, 1973 was an excellent year for pink and chum salmon and very poor for silver salmon. It is believed the harsh winter of 1970-71, which adversely affected the 1972 pink salmon return also created poor rearing conditions for fry and fingerling silver salmon returning as adults in 1973.

TABLE 8. Summary of Salmon Escapement for Selected Port Valdez Streams, 1973*

Stream	Maximum Count			Estimated Escapement		
	PS	CS	SS	PS	CS	SS
17 Mile	0	0	47	0	0	125
8 Mile Seep	49	377	63	75	450	150
Salmon Slough	6,500	686	107	6,600	1,000	250
Robe Lake System	15,000	125	325	15,000	150	1,500
Loop Road #1	7,000	37	0	7,000	100	0
Siwash Creek	26,000	232	6	28,000	300	20
City Limits	1,700	1,800	0	1,900	2,200	0
Mineral Creek & Flats	1,850	7,100	9	2,275	9,760	20
Total 1973				62,050	13,960	2,065
Total 1972				1,400	7,300	5,370

* Counts were made in cooperation with National Marine Fisheries personnel. PS - pink salmon, CS - chum salmon, SS - silver salmon.

Eshamy Lake System

Table 9 compares the commercial and sport fish catch of red salmon from the Eshamy Lake system since 1966. In 1973, the sport fish harvest almost doubled the catch in 1972. The commercial catch of 16,502 was the lowest recorded during this period except for those years when there was no open season.

The sport catch was 9% of the total run and the commercial catch 56%.

Cutthroat Trout

Cutthroat trout populations were sampled by gill net from anadromous and non-anadromous lake systems in Prince William Sound. Table 10 presents a summary of length and age data obtained.

The fish populations inhabiting Boswell, Canoe Pass #2 and Lilly Pad lakes are considered non-anadromous and exhibit slow but steady patterns of growth. Mean lengths of fish from the three lakes are very similar. The mean lengths, for example, of age V cutthroat from the three lakes are within an 18 mm range. Cutthroat trout growth in these systems is probably less than 50 mm in length a year.

Eshamy and Slate lakes cutthroat trout populations are considered anadromous. The growth rate of anadromous populations is more erratic and there is greater variation in lengths within age classes than for non-anadromous groups.

Gulkana River

Salmon Enumerations:

The counting tower on the Gulkana River was operated in 1973 from June 11 through July 31. During this period an estimated 1,292 red salmon and 318 king salmon, O. tshawyscha, passed the tower. The number of king salmon passing the tower in 1972 amounted to an estimated 19,861 red salmon and 760 king salmon.

During the 1972 operation, weather and water conditions were such that observations could not be made during 24% of the days scheduled for counting. In 1973, these same conditions prevented counts during 65% of the days of operation, thus an estimate of the total run was not obtained.

Aerial surveys of the Gulkana River system upstream from the counting tower indicated that many king and red salmon pass through the count area unobserved; this generally occurs during early summer when high water makes counts impossible. Because of the high percentage of no-count days and poor data obtained, the tower will not be operated in 1974.

Angler Counts:

During 1973, a total of 130 anglers were observed in the vicinity of the counting tower. Twenty-five of these fishermen arrived by aircraft, 95

TABLE 9. Red Salmon Catch and Escapement From the Eshamy System, 1966-1973

Year	Creel Census Period	Anglers	Sport Catch	% of Escapement	Escapement	Commercial Catch
1966	7/1 - 9/5		151	0.8	26,593	20,0826
1968	6/30 - 8/27		316	0.6	68,048	Season closed
1969	6/26 - 9/11		452	0.7	61,196	61,728
1970	6/25 - 9/1		448	3.7	11,460	17,292
1971	7/12 - 9/5		301	9.0	3,000*	Season closed
1972	7/1 - 9/10	389	1,353	2.5	28,750	52,903
1973		947	2,612	20.7	10,000	16,500

* Estimated

TABLE 10. Length and Age Composition of Cutthroat Trout from Prince William Sound Lakes, 1974.

Lake	Sampling Date	Otolith Age Class	No. in Age Class	Length Range (mm)	Mean Length (mm)
Boswell	9/15/73	IV	5	170-204	188
		V	5	172-279	214
		VI	3	258-260	260
		VII	3	272-380	317
		IX	2	306-344	325
Canoe Pass #2	9/20/73	III	2	145-175	160
		IV	11	188-220	205
		V	2	213-245	229
Lilly Pad	9/23/73	IV	4	190-260	225
		V	5	170-275	232
		VI	2	278	278
		VII	3	278-300	288
Eshamy *	6/30/73	V	4	268-385	321
		VI	10	255-380	270
		VII	3	298-333	311
		VIII	2	427-440	433
Slate	9/16/73	III	2	260-285	272
		IV	9	230-277	247
		V	1	275	275
		VI	3	330-365	343

* Fish taken by hook and line.

TABLE 11. Creel Census Summary, Gulkana River, 1973

	Upper * Section	Lower * Section	Total
Number of Completed Anglers Checked	268	93	361
Total Hours Fished	562.5	321.5	884
King Salmon Caught	4	3	7
Red Salmon Caught	55	8	63
Burbot Caught	5	0	5
Grayling Caught	6	1	7
Lamprey Caught	1	0	1
King Salmon per hour	.0045		
Red Salmon per hour	.07		
Hours fished per angler	2.4		
Salmon per angler	.2		

* Upper section was from one mile upstream of the Richardson Highway bridge to three miles below.

** Lower section was from confluence with Copper River upstream three miles.

floated down the river in rafts and canoes, and 10 came into the area using ATV's. In 1972, 114 fishermen were observed in the area. During 1973, the counting towers were operated approximately 25% of the day so the actual number of anglers using the area was much greater than the count.

Creel Census:

A creel census of salmon fishermen was conducted on the lower Gulkana River from June 14 through July 15, 1973. During this period the river was unusually high and muddy, and both fishing pressure and success was less than in the previous year.

Compilation of the creel census data (Table 11) shows that 361 completed anglers fished a total of 884 hours to catch seven king salmon and 63 red salmon.

King Salmon

King salmon escapement surveys were conducted on selected streams in the upper Copper River drainage in 1973, and compared to aerial counts for 1971 and 1972 (Table 12).

A major spawning area for king salmon was found in the Tebay River, a tributary of the Chitina River, where an estimated 800 fish were observed.

TABLE 12. King Salmon Aerial Surveys, Copper River Tributaries, 1971-73.

Stream	1971	1972	1973
Gulkana River	759	1,207	1,060
East Fork - Chistochina River	512	348	476
Grayling Creek	45	47	47
Mendeltna Creek	56	49	15
Kaina Creek	81	89	172
Tebay River			800

The Gulkana River tributary supports the largest run of king salmon and also receives the most recreational fishing pressure of all the upper Copper River tributaries. Most of the other tributaries that have king salmon runs are inaccessible to sport fishermen.

During creel census activities on the Gulkana River measurements and scale samples were taken from 38 king salmon. These fish ranged in fork length from 665 to 1,210 mm and averaged 1,025 mm. In 1972, a total of 33 king salmon measured averaged 1,026 mm. Female and male king salmon sampled in 1973 averaged 960 mm and 1,097 mm, respectively. Fifty-two percent of the king salmon were age 1.3, and 48% were age 1.4.

The estimated sport catch of king salmon from the upper Copper River drainage in 1973 was 1,000. The subsistence fishermen took 1,850 fish and the commercial harvest was over 20,000.

POPLAR GROVE CREEK GRAYLING

In 1973, a study of the swimming ability of grayling was initiated at Poplar Grove Creek, mile 136 Richardson Highway. The study was conducted by the University of Idaho in cooperation with the Alaska Department of Fish and Game under a grant from the U. S. Fish and Wildlife Service. The study site was 200 yards upstream from the mouth of Sourdough Creek, a tributary of the Gulkana River.

The first grayling entered the trap on May 15 when water temperatures reached 38°F. Observations of other streams in the area indicate similar temperature-movement phenomenon. Upstream and downstream migrants were trapped throughout the summer. A total of 890 sexually mature grayling moved upstream through the trap.

Young-of-the-year grayling began their out-migration in early September, and by October 19 approximately 62,000 0+ fish moved through the trap. The trap was removed on October 19 because of severe icing conditions.

Upstream migrating grayling captured at the weir were used in a series of swimming tests and then released. Two hundred and seventy-six grayling were tagged with dart tags. The tagged fish ranged in fork length from 175-345 mm and averaged 270 mm.

Eighteen tags were returned by anglers (Table 13). Fifteen of the tagged fish were caught from Poplar Grove Creek at Mile 138, Richardson Highway, where it intersects the stream (Figure 3). Eight were caught within eight days of being tagged, and all 15 were taken within 19 days.

Three tagged grayling were recovered by anglers from the Gulkana River, 10, 21, and 23 miles, respectively, upstream from the mouth of Poplar Grove Creek.

Lake Rehabilitation

During 1973, Bearcub Lake, located at Mile 78 on the Tok Highway, was treated with rotenone. Species of fish killed include grayling, whitefish, suckers, and burbot. Following detoxification the lake will be stocked with salmonoids.

Habitat Protection Investigations

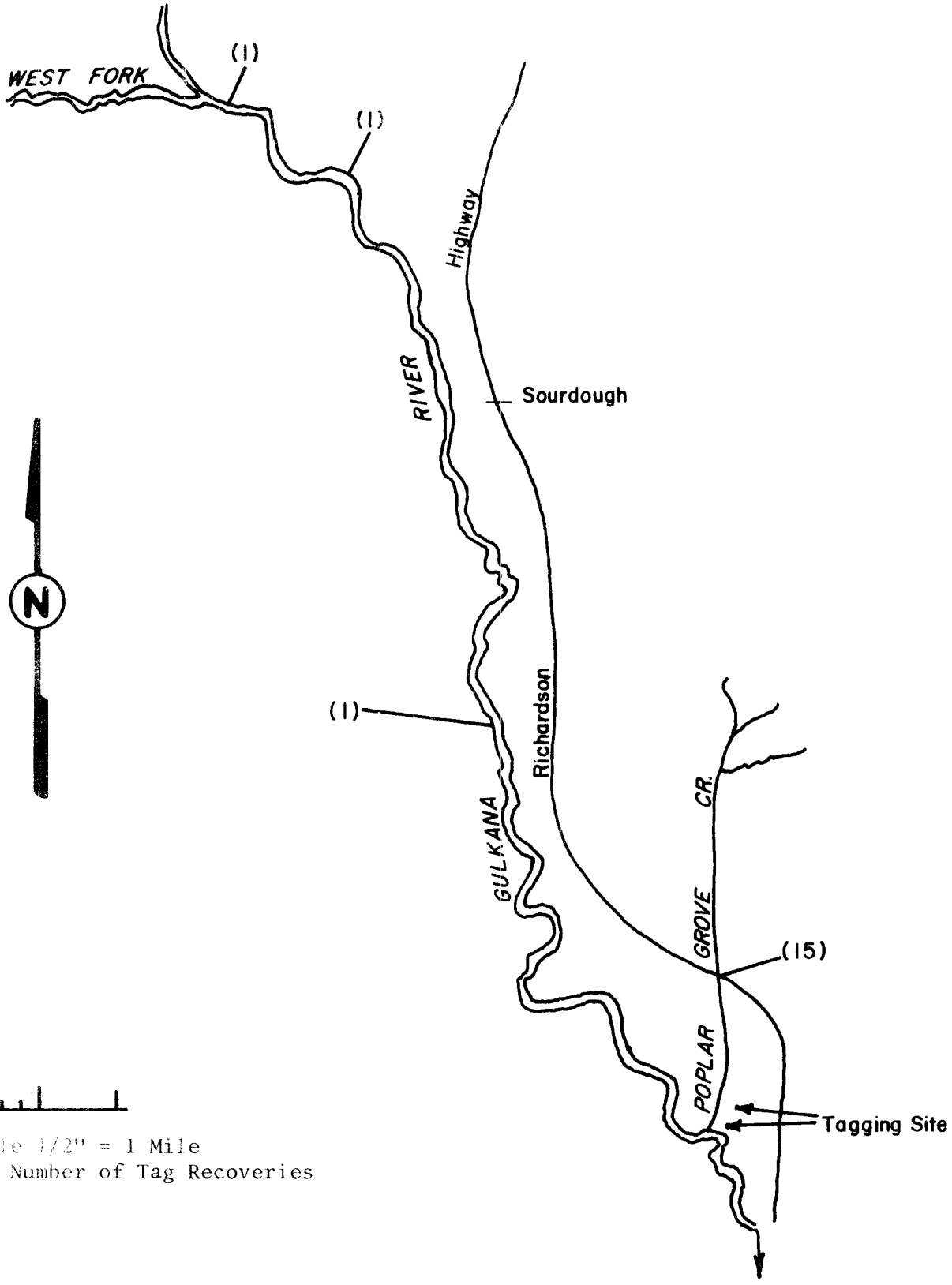
A total of 22 federal, state, and private construction projects involving potential fish and fish habitat losses were investigated in 1973 and recommendations made to mitigate these losses.

Periodic inspections were made of several construction projects, including those on the Lowe River, Nelchina River, Copper River, and the Gulkana River.

TABLE 13. Grayling Tag Recoveries, Poplar Grove Creek Study, 1973

No. of Fish	Date Tagged	Date Recovered	Location of Recovery
1	5/16/73	7/3/73	1/4 mile below West Fork, 23 miles upstream on Gulkana River.
1	5/16/73	7/18/73	4 miles above Sourdough, 21 miles upstream on Gulkana River.
1	5/17/73	7/10/73	5 miles below Sourdough, 10 miles upstream on Gulkana River.
3	5/16/73	6/2/73 6/3/73 6/5/73	2 miles upstream on Poplar Grove Creek at highway crossing.
6	5/17/73	5/20/73 (2) 5/21/73 6/1/73 6/3/73 (2)	2 miles upstream on Poplar Grove Creek at highway crossing.
3	5/10/73	5/20/73 (2) 6/4/73	2 miles upstream on Poplar Grove Creek at highway crossing.
3	5/19/73	5/20/73 (2) 5/27/73	2 miles upstream on Poplar Grove Creek at highway crossing.

FIGURE 5. Tagged Grayling Recoveries, Poplar Grove Creek and Gulkana River.



Critiques of the proposed Wrangel Mountains National Park and Wrangel Mountains National Forest were prepared.

Data concerning the biological aspects of the Trans-Alaska Pipeline was furnished to the Interagency Fish and Wildlife Team.

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